

Claims

What is claimed is:

1. A method for increasing rotational velocity of a data storage disc in a disc drive, the method comprising steps of:
 - 5 (a) accelerating the data storage disc at a first acceleration rate from an initial rotational velocity to a first predetermined rotational velocity;
 - (b) accelerating the data storage disc at a second acceleration rate from the first predetermined rotational velocity to a threshold rotational velocity; and
 - (c) as the data storage disc rotates at the threshold rotational velocity, moving a transducer from a landing zone to a data region on a surface of the data storage disc, wherein the threshold rotational velocity creates and maintains an air bearing between the transducer and the surface of the disc.
- 10 2. A method as defined in claim 1, wherein the threshold rotational velocity is a final rotational velocity creating and maintaining the air bearing as the transducer radially traverses across the disc between an inner diameter and an outer diameter.
- 15 3. A method as defined in claim 2, wherein the accelerating step (b) comprises steps of:
 - 20 (i) accelerating the data storage disc at the second acceleration rate from the first predetermined rotational velocity to a second predetermined rotational velocity;
 - (ii) accelerating the data storage disc at one or more next acceleration rates from the second predetermined rotational velocity to the threshold rotational velocity if the second predetermined rotational velocity does not equal the threshold rotational velocity.
- 25 4. A method as defined in claim 2, wherein:
the accelerating step (a) comprises accelerating the data storage disc at the first acceleration rate between an initial time corresponding to the initial rotational velocity and a first predetermined time corresponding to the first predetermined rotational velocity; and

the accelerating step (b) comprises accelerating the data storage disc at the second acceleration rate between the first predetermined time and a threshold time corresponding to the threshold rotational velocity.

5 5. A method as defined in claim 4, wherein the moving step (c) comprises a step of: displacing the transducer from the landing zone at the threshold time.

6. A method as defined in 1, wherein the threshold rotational velocity is an early exit velocity creating the air bearing as the transducer exits the landing zone and accesses the data region.

7. A method as defined in claim 6 further comprising a step of:
(d) accelerating the data storage disc at a third acceleration rate from the threshold rotational velocity to a final rotational velocity maintaining the air bearing as the transducer locates to an outer diameter of the data storage disc.

8. A method as defined in claim 7, wherein:
the accelerating step (a) comprises accelerating the data storage disc at the first acceleration rate between an initial time corresponding to the initial rotational velocity and a first predetermined time corresponding to the first predetermined rotational velocity; and
the accelerating step (b) comprises accelerating the data storage disc at the second acceleration rate between the first predetermined time and a threshold time corresponding to the threshold rotational velocity.

25 9. A method as defined in claim 8, wherein the moving step (c) comprises a step of: displacing the transducer from the landing zone at the threshold time.

10. A method as defined in claim 9, wherein the accelerating step (d) comprises a step of:
accelerating the data storage disc at the third acceleration rate between the threshold time and a final predetermined time corresponding to the final rotational velocity.

11. A method as defined in claim 7, wherein the accelerating step (b) comprises steps of:

(i) accelerating the data storage disc at the second acceleration rate from the first predetermined rotational velocity to a second predetermined rotational velocity;

5 (ii) accelerating the data storage disc at one or more next acceleration rates from the second predetermined rotational velocity to the threshold rotational velocity if the second predetermined rotational velocity does not equal the threshold rotational velocity.

10 12. A method as defined in claim 7, wherein the accelerating step (d) comprises steps of:

(i) accelerating the data storage disc at the third acceleration rate from the threshold rotational velocity to a second predetermined rotational velocity;

15 (ii) accelerating the data storage disc at one or more next acceleration rates from the second predetermined rotational velocity to the final rotational velocity if the second predetermined rotational velocity does not equal the threshold rotational velocity.

13. A program storage device readable by a computer system tangibly embodying a program of instructions executable by the computer system to perform a method for increasing rotational velocity of a data storage disc in a disc drive, the method comprising steps of:

- (a) accelerating the data storage disc at a first acceleration rate from an initial rotational velocity to a first predetermined rotational velocity;
- 5 (b) accelerating the data storage disc at a second acceleration rate from the first predetermined rotational velocity to a threshold rotational velocity; and
- (c) as the data storage disc rotates at the threshold rotational velocity, moving a transducer from a landing zone to a data region on a surface of the data storage disc, wherein the threshold rotational velocity creates and maintains an air bearing between the transducer and the surface of the disc.

14. A program storage device as defined in claim 13, wherein the threshold rotational velocity is a final rotational velocity creating and maintaining the air bearing as the transducer radially traverses across the disc between an inner diameter and an outer diameter.

15. A program storage device as defined in claim 14, wherein the accelerating step (b) of the method comprises steps of:

- (i) accelerating the data storage disc at the second acceleration rate from the first predetermined rotational velocity to a second predetermined rotational velocity;
- 20 (ii) accelerating the data storage disc at one or more next acceleration rates from the second predetermined rotational velocity to the threshold rotational velocity if the second predetermined rotational velocity does not equal the threshold rotational velocity.

25 16. A program storage device as defined in claim 14, wherein:
the accelerating step (a) comprises accelerating the data storage disc at the first acceleration rate between an initial time corresponding to the initial rotational velocity and a first predetermined time corresponding to the first predetermined rotational velocity; and

- the accelerating step (b) comprises accelerating the data storage disc at the second acceleration rate between the first predetermined time and a threshold time corresponding to the threshold rotational velocity.

17. A program storage device as defined in claim 16, wherein the moving step (c) of the method comprises a step of:

displacing the transducer from the landing zone at the threshold time.

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18. A program storage device as defined in claim 13, wherein the threshold rotational velocity is an early exit velocity creating the air bearing as the transducer exits the landing zone and accesses the data region.

19. A program storage device as defined in claim 18, wherein the method further comprises a step of:

(d) accelerating the data storage disc at a third acceleration rate from the threshold rotational velocity to a final rotational velocity maintaining the air bearing as the transducer locates to an outer diameter of the data storage disc.

20. A program storage device as defined in claim 19, wherein:

the accelerating step (a) comprises accelerating the data storage disc at the first acceleration rate between an initial time corresponding to the initial rotational velocity and a first predetermined time corresponding to the first predetermined rotational velocity; and

20 the accelerating step (b) comprises accelerating the data storage disc at the second acceleration rate between the first predetermined time and a threshold time corresponding to the threshold rotational velocity.

25 21. A program storage device as defined in claim 20, wherein the moving step (c) of the method comprises a step of:

displacing the transducer from the landing zone at the threshold time.

22. A program storage device as defined in claim 21, wherein the accelerating step (d) of the method comprises a step of:

30 accelerating the data storage disc at the third acceleration rate between the threshold time and a final predetermined time corresponding to the final rotational velocity.

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23. A program storage device as defined in claim 14, wherein the accelerating step (b) of the method comprises steps of:

- (i) accelerating the data storage disc at the second acceleration rate from the first predetermined rotational velocity to a second predetermined rotational velocity;
- 5 (ii) accelerating the data storage disc at one or more next acceleration rates from the second predetermined rotational velocity to the threshold rotational velocity if the second predetermined rotational velocity does not equal the threshold rotational velocity.

10 24. A program storage device as defined in claim 14, wherein the accelerating step (d) of the method comprises steps of:

- (i) accelerating the data storage disc at the third acceleration rate from the threshold rotational velocity to a second predetermined rotational velocity;
- 15 (ii) accelerating the data storage disc at one or more next acceleration rates from the second predetermined rotational velocity to the final rotational velocity if the second predetermined rotational velocity does not equal the threshold rotational velocity.

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25. A disc drive having a data storage disc rotably mounted to a base plate and operable to spin at a rotational velocity and an actuator arm mounted on the base plate adjacent the disc, the disc drive comprising:

5 a transducer attached to the actuator arm and parked on a landing zone on a surface of the disc, the transducer being operable to move over the surface of the disc as the disc reaches a threshold rotational velocity; and

means for accelerating the data storage disc at multiple acceleration rates from an initial rotational velocity to the threshold rotational velocity.

10 26. A disc drive as defined in claim 25 further comprising:

means for moving the transducer from the landing zone to a data region on the disc at the threshold rotational velocity.

15 27. A disc drive as defined in claim 26, wherein the threshold rotational velocity is a final rotational velocity creating and maintaining an air bearing between the transducer and the surface of the disc as the transducer radially traverses across the disc between an inner diameter and an outer diameter.

20 28. A disc drive as defined in claim 26, wherein the threshold rotational velocity is an early exit velocity creating an air bearing between the transducer and the surface of the disc as the transducer exits the landing zone and accesses the data region.